

Lead and Our Children: The Role of Early Care and Education Programs

[Opening credits]

Florence Rivera: Good afternoon, and welcome to the National Center on Early Childhood Health and Wellness webinar: "Lead and our Children: The Role of Early Care and Education." As many of you are aware, lead has catapulted into the national media recently, with the crisis occurring in Flint, Michigan. However, lead has really been a concern for many of our communities for much longer than this recent crisis.

So, we won't be focusing on Flint, Michigan specifically today, but rather providing an overview of the issue, prevention and treatment. And we encourage all of you to evaluate how the strategies we offer today can be tailored to your community. And I see that a couple of questions have already come in about the webinar and slides being archived. And yes, they will be placed on ECLKC at some point after that webinar. And the webinar is being recorded, so you will have access to those as well.

So, just to answer that question before we get started. And with that said, it's with great pleasure that I introduce our main faculty today, Dr. Jennifer Lowry. Dr. Lowry is joining us from Kansas City, and is board certified in pediatrics and medical toxicology. She spent five years as a medical director to the University of Kansas Hospital Poison Control Center. She's also the chief of the section of clinical toxicology at Children's Mercy Hospital, and has served as the director for the America Pediatric Environmental Health Specialist unit for EPA Region 7 and liaison to the Region 7 Agency for Toxic Substances and Disease Registry; she's a current member of the Children's Health Protection Advisory Committee for the EPA, and chair of the American Academy of Pediatrics Council on Environmental Health. So, needless to say, Dr. Lowry offers considerable expertise and experience within our topic today. And I'm very pleased she was able to join us. Dr. Lowry, I'll turn the presentation over to you. Just let me know when you'd like to change sides and I'll forward those for you.

Dr. Jennifer Lowry: All right. Thank you, very much. And please let somebody know if you can't hear me or if [inaudible] have a question or that sort of thing. I'm very honored to be speaking with you today, and unfortunately about lead. But fortunately, we do also know more about lead than we know about many of the environmental toxins that we come in contact with on a daily basis.

So, I think we're on slide Q, which is where I talk about lead. So, many of us are wondering, what the heck? How did we get lead in--clearly in water, but also in other things? And what we need to know is lead is a metal that's naturally in the Earth's crust. It is actually formed over millions of years, and just hanging out in the Earth. And somebody discovered it at some point and put it into pipes. And actually, the history is very interesting. We'll get to that in a little bit.

But we used to put it in paint, we used to put it in gasoline, for a lot of different reasons. It was in paint for the color. We used it in gasoline as an anti-knock substance. So we still use it in batteries, solder, clearly pipes, pottery; roofing materials, cosmetics, you can also have it in jewelry, it can just be in a lot of different things. And what's most important to know is that lead actually is not broken down. It's not biodegradable. It's not metabolized in our body. It actually just stays there and doesn't really go anywhere.

Next slide. All right, so I can't be a toxicologist without talking about the history of lead. And it's a fascinating history if you ever want to go back and read about it. But again, man has been using lead for a really long time. And it actually increased more during the industrialization times, and it resulted in serious health hazards. And in fact, even before that time, it was used in ancient Rome. And they actually had lead pipes as well. They did not have an anti-corrosion chemical that was put into it, though.

And so, they would have a lot of water and sewage that would go through and cause the leeching of lead from the pipes. And so they would be obviously be drinking a lot more of it. And it was theorized to have led to the fall of the Roman Empire. And then we just kept using lead in other things. And so we would put it into the paint even in the Renaissance period of time. And so even a lot of famous painters had lead toxicity due to their paint ingestions and the fumes that came from that.

Next slide. So, then in the 14th to 16th centuries, we started recognizing that lead was a poison and an occupational hazard. Because they used lead--it wasn't actually used a lot in the metals themselves, but a lot of gold and other metals had contamination of lead and mercury and other heavy metals kind of in them. So, when you would heat up the metals to kind of separate the gold from the lead or silver from the lead or from whatever, and you would actually heat up the lead until you'd have lead poisoning from that.

And so some of these workers would become ill. And there's even some documentation of physicians making recommendations to take preventive measures to avoid poisoning, especially out there while doing this heating, like keeping the windows open, and covering their mouth with a rag and to avoid aspiration of the dust. And there are people who may have listened to their physicians then, but it was continued still to be used-- put it in wine, and that sort of thing. And then, in the 17th and 18th centuries, as [inaudible] had the industrial revolution, there's just been more things to put lead into. And again, because it doesn't go anywhere, many would be poisoned.

Next slide. In the 19th and 20th centuries, we became more knowledgeable about lead toxicity, especially being recognized by physicians. It's actually an interesting history in that there was a pediatrician in Australia who found a number of children who were dying, actually, and then also were becoming very confused, and having a seizures. And he did his own epidemiological study and found that all of these children were eating paint chips. And so, he wrote this kind of sentinel paper that said: Hey, you know, paint has high lead, it causes health problems in children. We really need to take lead out of paint. And that was in the early 1900s. And as a result, every industrialized country in the world took lead out of their paint, with the exception of the United States. And a similar thing sort of happened with gasoline, as well. But it still wasn't until the late 1970s when lead-based paint and

gasoline were, started to--actually gasoline started being phased out in the early '70s. But by 1978, paint and gasoline had lead removed.

But that is not to say that we don't have any paint with lead in it. Because you can actually use--there's lead in paint that we use on our roads; there's lead in paint in some other areas and renewed half gasoline that has lead in it, especially for aviation. During all of this time, because it was starting to be recognized that lead was, again, as a poison, and the first health-based action level of 60 micrograms per deciliter was chosen, because that's actually where health effects in adults occur. And over time, there was recognition that lead was actually more toxic than that.

So, it's not that lead became more toxic over time, it's just really our recognition that lead is toxic. And so it went from an actual level of 40, to 45, to 25 to 10. And then in 2012, CDC recognized that there is no safe lead level, and that now put it in our reference level that five micrograms per deciliter, which is where we are now.

Next slide. All right, so what happens when lead enters our body? And what are the bad health effects? So, lead poisoning occurs when lead actually starts building up in the body, often over a period of months or years after we have this exposure. And like I mentioned, you know, it was first reported in Australia. And with the encephalopathy that occurred. But even throughout the 1900s and the 20th century, there have been so many articles out there about a cognitive disturbance in children with lead poisoning. And those are even undocumented as early as 1940s and 1950s.

And so, again, this kind of goes back to what I was just talking about, in that we, over time, have recognized that there is no safe lead level, and there's a lot of misconception of what the reference level of five means. It's not an actual level. It's a recognition that there's no safe lead level, and that over 98 percent of children have a blood level less than five, but they're still significant--you know, two to three percent that continue to have blood levels above that.

Next slide. So, this is a little bit of a difficult--were gonna have to kind of look at it up on the left. You can see the number of children tested our blood lead levels and their surveillance. So you can see that those number of children tested have gone up over time, and then it's come down again. And compared to those that have confirmed blood lead of greater than ten, what you need to know here though, is that you can only do assessments on what you know about.

So, you have to get children tested. And so, we only know the prevalence of blood poisoning based on the number of children that are tested and then found that have elevated blood lead. But we do know that not everybody is tested. We know that only maybe 20 percent of children that are eligible are required to have testing actually get tested. And so, we are missing, probably, close to a million children in the United States that have elevated blood lead and we just don't know what they are.

And so, we used to say, and something people would still argue, that lead is our success story, in that, you know, we've decreased the number of children with elevated blood lead 8 percent down to less than 1 percent, but that's not exactly true because we do not actually know the denominator.

Next slide. We also know that the effects of lead are costly. In fact, recent estimates that indicate more than 50 billion dollars in a single year is lost as a result of reduced cognitive potential and associated loss of productivity. So, again, we know from a population standpoint that children lose two to three IQ points for elevated blood levels above five. The problem is that that's not a population standpoint. So, I can't see a patient in my clinic, and we could bring the kids of Flint into the story, that child cannot come into my office and I would tell them, yeah, OK, your IQ was 80 and now it's going to be 77. I can't do that.

But we do know from a population standpoint that that it does cause IQ loss and loss of productivity. And we can estimate that if we actually did lead poisoning prevention, by preventing all of these children from being poisoned in the first place that we would be able to--well, obviously save lives, but sometimes they want to hear about the money.

Next slide. So at these low levels, so blood levels of five or even lower and even at lead levels up to 25 to 30, these children are not symptomatic. They do not have any symptoms. There may be something; if they have an acute ingestion of lead paint chips, they may have some of abdominal pain. They may have some vomiting or constipation. But oftentimes, you do not know that these children have elevated blood lead. And I've had kids that have had higher blood lead levels, where they had some good speech at one point, and now they're not talking very well, or they've had a speech delay and they're 3 years of age, and you wonder if the lead played a role. But from an acute standpoint, from a kid who is just eating paint chips, they're not going to act any differently and some things may get missed. And that's why we do the surveillance that we do.

Next slide. So this is a slide that comes from the CDC that, basically, talks again more about the adverse effects of lead. And it compares the effects in children compared to adults. And I think the most important thing to point out here in regard to kids is that kids are more vulnerable than adults are to the effects of lead. And that's largely because of the developmental issues. I mean, their brains are growing. The brain isn't actually done until 25 years of age.

But to have our most rapid rate of growth is obviously in early childhood, especially one to three years of age, but one to five years of age. And so, you put in a neurotoxin like lead into the mix, you're going to have long term life long effects from that lead poisoning. Whereas, as an adult, if I were to be poisoned by lead right now, I may have some of the other systemic symptoms, but I wouldn't necessarily have the neurologic symptoms. But it's just important to note that children have a more pronounced effect at lower levels than adults do.

Next slide. So, the biggest issue that when we talk about the health effects of lead exposure are the neurological problems, the IQ loss, and the neurological problems that have been associated with ADHD and behavior problems. But there are other things that can happen. So, we know that even at blood lead levels as low 5 micrograms per deciliter, you can not only have behavior problems and decreased IQ, but you can start seeing problems with blood pressure, you can start seeing anemia, and those sort of symptoms.

As the levels start getting higher, you actually get the iron deficiency, anemia is more pronounced. And then at levels of 45 or higher you start getting more of the GI issues. You can have significant-- the neurological problems, like seizures and coma, and even death, but those are going to be at acute levels, much higher than even sometimes 70 to 100 micrograms per deciliter. On the slide here it talks about birth defects and growth retardation. That's more with significantly with prenatal exposure than with children's exposure. But it's important to note that many things can be affected by lead based on the level and the [inaudible] of the exposure.

Next slide. And again, what most people are talking about these days are the behavioral outcomes. So, again, we know that low level exposure to lead have been linked to behavioral factors that can further impact their educational outcomes, like ADHD, anti-social behavior, and conduct disorders. We know that kids are impulsive, have more aggression and a shorter attention span has been associated with lead intoxication. It doesn't necessarily mean that this lead poisoning caused it, but it can actually be multifactorial with other things that are going on in their lives. And we know that parents have reported that while in recovery from acute poisoning, such as removing them from their sources, that as the lead level decreases, their child's behavior changes dramatically as well. But also that the higher the blood level, the more behavioral problems that can occur.

Lastly, I think it's also important to note that behaviors that we have from ADHD can't necessarily be diagnosed straight as ADHD, but that lead, again, causes behavior problems. And, if you already have a predisposition to ADHD, you're more likely to get that diagnosis. So, I know it's a kind of a fine line, because many children with ADHD probably did not have lead poisoning. But lead poisoning can actually give you more predisposition for those behaviors. It's slight nuances.

Next slide. All right, so why the big deal? Well, of course, I'm speaking to the choir on what the big deal is. If you lose IQ points, you lose testing scores, you have problems with reading, you have these learning disabilities. You're not going to learn. And that just sets you back. What's important to note, and again, it's really hard to look-- when you look there's a lot of studies that have looked at children with elevated blood lead levels versus with lower blood lead levels, and then did all of the scoring and a lot of the testing that has gone on.

So, what we need to remember is that many of these children that have elevated blood lead are already living in areas of lower socioeconomic areas. So, again, they may be living in poverty; they may only have one parent; they may not be getting food; they may not be getting good play; they may not have an enriched environment. And then, you throw lead poisoning on top of them, it just actually makes it much, much worse. And so, some of these children may already have a couple of things against them; but when you throw lead at them, it actually makes it harder for their brain to adapt to all those other things that are going on. And they really do need enriched environment to overcome them. And what

this graph basically shows is that at the higher blood lead levels, the decrease in your IQ. And again, this is on a population basis and not based on each individual patient.

Next slide. I already brought up a little bit about lead poisoning in pregnancy. I follow actually a number of children who were exposed to lead in utero from either mom's occupation or mom's hobbies. I mentioned that lead could be found in ceramic pottery, especially in those of Hispanic ethnicity. And if you put orange juice in a pottery that has lead in it, the acidity will actually leech out lead into the orange juice, and then you'll be drinking it. And we have a lot of moms who have been poisoned that way, and lead readily passes through the placenta, and has been measured in the fetal brain, as early as the end of the first trimester. And so, there are specific health problems that can happen in a mom that can actually increase the lead absorption.

So, if mom's already has malnutrition, iron deficiency, which is obviously very common in pregnancy--lead can be absorbed more efficiently in iron deficiency anemia. And so, what happens is that the lead gets distributed to the fetus; it can get into the brain and cause neurological issues that way, too. Mom can also have gestational hypertension. Lead has been associated with spontaneous abortion, low birth weight, prematurity and like I mentioned, impaired neurodevelopment. Research also suggests that prenatal lead exposure can adversely affect maternal and child health across wide range of maternal exposures.

So, again, mom may have some well designed [inaudible] suggests that maternal lead exposure during pregnancy is inversely related to fetal growth. So, at a higher amount of lead, you actually have worse outcomes with the baby, as well. And moms who have been poisoned over time--over time, lead actually goes into the blood and then goes into the soft tissues, and then eventually gets into bone. And when you're pregnant, you can actually mobilize the lead from the bone more readily. And so, blood levels will actually go up during pregnancy compared to before they were pregnant.

Next slide. And this slide actually just shows where all of this goes. So, if mom has past exposure, it's already in her bone, and then the lead becomes more mobilized and can get into the red blood cell where it substitutes for iron and the hemoglobin. And then, obviously, the blood goes into through the umbilical cord to the placenta, and then into the baby. And actually, we've been able to measure lead in bone in the fetus, and found that it goes right into their bone as well.

So, when they're born, they have elevated blood lead, they have blood poisoning. And it takes a very, very long time for that lead to get out of the bone. We also know that it passes to breast milk. And so the baby can get lead poisoned from the mom during breastfeeding.

Next slide. All right, so that's pregnancy. Now, once the baby's born-- we're not going to talk about water, for the first much. But for the first year of life, if they're not breast feeding, then they're also getting formula. And oftentimes that formula is mixed with water. And so, if you are in a family that lives in Flint, Michigan, or any other place that has elevated lead in their water, which unfortunately, is quite a few places we're finding out now, the majority of that lead poisoning that occurs in the first year of life or at least the first six months of life, is actually from water.

But when the child starts growing up and starts crawling around, they're being very curious, because we know kids are curious, and they have a lot of hand-to-mouth activity, they get the peeling lead paint on the wall. And so, they'll find it and then they'll peel it off and they'll put it in their mouth. We also know we have lead in our dust. Because that paint gets ground up and it gets into dust. And so, anything that the child is crawling around on, has their toy, they're going to eat the dust from that. We also know that we have lead in some of our toys, if they're not made in the United States. We have lead in our soil still, from gasoline.

So, when we had lead in the gasoline the exhaust from our Remember, I told you that lead doesn't go anywhere. cars would go out into the air and then settle in our soil. And so, we'd have kids-- they like pretending that they're drinking a chocolate shake, and then they make their soil slurry and then they drink it. And so we have a number of kids that are poisoned from their soil. I mentioned the glazed pottery already, where the lead can be leeching out. Same thing with the lead crystals.

Usually, we don't to worry too much because nobody's really putting on [inaudible] crystal. But, if it's the crystal that's actually on the rim of the wine glass: Sometimes, people like to chew on it and get it that way. And we used have lead in our cans. We don't necessarily have those anymore. We have a lot of other lead exposures in the outdoor environment. We do have lead used in industry, like I said in the battery plants, and they can get into the air. And there are regulations to how much lead can be put out into the air, but that's a regulation per industry.

So, if you have one factory next to a factory to another factory, you've got three. They have regulation to what they can release, but that doesn't mean that there is regulation-- well, there is a regulation--on how much lead can be in the air at one time, but it's actually an average. So, kids can get it in the air. And the new lead poisoning in adolescents is the firing ranges, when have lead bullets that are being used. And if they're an indoor firing range, the dust from that can actually increase exposures.

Next slide. So, while I know a lot of conversation has happened in regard to Flint and water, lead-based paint is the most common mechanism for children to have lead poisoning. I showed some pictures here. And these pictures from our group here in Kansas City, where we've gone to homes and done home assessments. And these are all homes that have peeling paint chips. And all of this that you see in this picture are paint with lead in them.

If any of you guys have ever been sunburned and you have like your skin peeling off you--it's kind of fun to actually pick your skin, you know, peel it off. It's really fun to go to homes and peel off the paint and see how big of a flake you can actually get. And so kids think it's fun. Lead-based paint was used primarily before 1950. It was phased out in the late 1970s. So, now we evaluate homes that were built before the 1970. But it's been estimated that more than 25 million homes still contain significant amounts of lead paint in their home. And 38 million homes with lead-based paint with 24 million of these with deteriorated paint. So, we have a ton of homes that have these. And despite considerable attention and resources from many different agencies: They would say that lead is our big win, but I can argue that it's not.

Because what we do is we are very reactive when it comes to lead poisoning. We wait for the child to become poisoned, and then at one to two years of age we get a lead level and they go, oh, your lead level is high: Let's go fix it. Where at that point the damage has already been done. What we need to do is primary prevention, where we go out and we find these 25 to 40 million homes with lead-based paint and fix them before children move in.

Next slide. Other ways for children to get exposed include, again, the occupational, the take home lead dust. So, those that are working in manufacturing, plumbing, [inaudible]. We had a kid that dad was working as a printer and was using ink that actually had lead and cadmium in it, and we went into the workplace, with OSHA, and found that there lead and cadmium everywhere. And of course dad was taking it home to the child. Different folk remedies and cosmetics-- so, the kohl, the K-O-H-L, that you put on your--different ethnicities put on their skin as cosmetics-- that can have lead in it as well. The glazed pottery, as I mentioned-- we just actually had a kid in Kansas who still had mini blinds with the lead in them.

And I don't know how old the house was, I mean, it wasn't very old. But the child had a fairly significant lead level, and it was from the mini blinds that were over the child's crib. Some of the stain glass, the soldering can have it. We had another kid that had autism, and it was very sensory, and liked playing with beads, and ended up finding these heavier kind of beads to play with. And the child had elevated blood lead. And what had happened is that the dad had given the lead weights to the child to kind of hold for his sensory issues. And the child had elevated blood lead from the lead weights or the lead sinkers. And there are some candies, and toys, and whatever also that have lead. And there was that couple years ago that there was lead in lipstick. So, again, there are all sorts of things that can have lead in them. And we just have to be very aware of what's happening and where our products are coming from.

The next slide: So, there are certain, again, we tend to focus on children under the age of six, with a primary focus at one to three years of age, again because of the high hand-to-mouth activity. Additionally, children--we all have a blood brain barrier that prevents things from getting into our brains. Sometimes bad things pass anyway. But kids actually have an immature blood brain barrier, and so lead actually enters more freely.

There are other at-risk populations, and you know, we do the lead screening in our pediatrician's office often, but we will never be able to ask all of the questions that need to be asked. And so it really takes the astute practitioner, and teacher, and educator, and everybody that's involved with children to recognize that this child may be at risk. So, if they live in poverty, living in homes built before 1978 which I mentioned higher than 1950 are the highest risk; inner city urban areas get a higher exposure-- those who have poorer nutrition, although I don't know any three-year-old who readily drinks their milk and eats their green vegetables. But iron deficiency anemia and low calcium can actually increase the amount of blood that can be absorbed. And if you have poor access to quality, early education and just living in overall poverty themselves, you have more at risk for the effects from lead.

Next slide. So, the screening--by law, according to CMS, so the Medicaid/Medicare folks all children who are on Medicaid are required to have a blood lead test at one and two years of age. So, that's when you're supposed to do it. So, not all Medicaid patients actually get or children get this test done. But, that's actually the population that is most at risk and the population that we have the most data on. Now, CDC actually states, and the AAP, technically, agrees with them that any child under the age of six who has a positive risk of this needs to be tested. So, obviously, that would include all children on Medicaid. But it includes other children. But you have to ask the right questions in order to get that testing done.

And so, when we say screening, some people think of screening as: we're gonna ask the questions, versus screening, we're going to do the capillary blood lead test. Those are two different things. So, mandatory screening from CMS is the actual blood test. Screening for CDC is asking the question. It's important to note--I think all children ought to have a blood lead test--but if you have a positive screening, especially on the blood test, that could actually be a false positive. And so, all children that have a positive blood screening test need to have it confirmed with a venous test. It's all very confusing. And I think this is where we kind of get messed up. When we're going to health departments and we're going to physician's offices of what the actual screen means. But ideally all children at one and two years of age would get the capillary blood test, and all children, especially if they were at high risk.

So the next slide--there are a number of different tools. This is just some questions that are from CDC. And I just want to point out you can see that if you ask these five questions, you are going to miss something, right? And so that's why it's just easier to test them all. But again, if you're not asking the right question, you're going to get a no answer. And I've had a number of children where they have had "no" to all of these questions, but they got their lead test anyway and they were elevated.

Next slide. There's a lot of different ways for treatment. This is the CDC's version of how we quantify mild, moderate and severe. I don't necessarily agree with this, largely because [inaudible] from up to date. Because mild intoxication occurs basically at all blood levels.

And so to say that they go from zero to 44, I think, is ridiculous. It's really not important to focus really on mild, moderate intoxication, moderate and severe, but I can tell you we're not going to do chelation therapy, or give you a drug that's actually going to bind onto the lead, which is what chelation is, until your level is 45 or above. And that's because we know that the best treatment for these children is removing the source. So, if you find a child with an elevated lead of 40, if you find the source of lead and you remove the source from the child, or you remove the child from the source, that level is going to come down.

In fact, there was a really good study that compared these kids, just removing the source alone, or removing the source and giving chelation therapy, and at the end of the study the lead levels were the same. So, it's really not worth the risk of giving the medication, if we can find the source and remove them. That said, if a child has an elevated lead level of 45, I'm going to give them the medicine. And if they are really symptomatic and having some problems, I'm going to admit them into the hospital and I'm going to give them IV therapy.

Next slide. It's also important to know that there are some nutritional interventions that we should do. I mentioned that calcium and iron, if they are low, can actually increase blood absorption. So, it's important that we give this back to kids. Vitamin C not only increases the absorption of lead, but it also increases the absorption of iron. So, if we give our iron with vitamin C, you're more likely to have an increase in iron absorption.

Next slide. We do have some recommendations on monitoring based on what their lead levels were. This is based on a CDC from 2012, and that was before they decreased it from the actual level of 10 to a reference level of five. That said, if you guys don't know anything about the pediatric environmental health specialty units, I would encourage you to ask Florence more about those, or me, you can send me an email. But you have experts to help you along the way to know when children need to be retested.

Next slide. And really, the issue is preventing exposures. And so again, I would argue that we need to do primary prevention. We need to make sure that we are not sending children to homes that have high lead levels. It's important also that they have a medical home, that they have a family or a practitioner who is actually going to follow these kids and to know the testing that needs to be done and when it needs to be done. The health department can help with water testing and paint testing if they have elevated blood lead. They may not be so helpful though, if you don't already have elevated blood lead. But you can actually go to different stores to get lead wipes and send those in.

The issue is really looking at these homes improve [inaudible] and making sure that we don't have peeling paint, and we have cleaned up our dust. When you see peeling paint, you shouldn't actually sand it down or that kind of thing; it's really taking a wet cloth and kind of wiping it down, so that you don't make the dust more. There are rules to renovating, and it's really important that you do it in a lead-safe manner. And there are little pamphlets in all of those--like Home Depot, Lowe's, those kind of places that can help you with that. But really, all of these effects from lead can be overcome in a supportive and nurturing home environment.

It makes me mad when I think about those kids in Flint, how everybody's telling them that they are going to have these loss of IQ points, and they're already going to have so many things bad happen to them. That may be true if we did nothing. But if we actually have a supportive, enriched environment for them to live and grow and learn, they can overcome their effects from lead. With that I'm going to turn it back over.

Florence Rivera: Thank you, Dr. Lowry. And I see that there are some really wonderful questions coming through in the tap box, so I just want to encourage everyone to submit your questions through that mechanism. It should be on the side of your screen. And then we will post those to Dr. Lowry at the end. But I wanted to talk just a little bit.

First off, let me introduce myself for those who joined us later. I'm Florence Rivera, and I'm with the National Center on Early Childhood Health and Wellness. And I want to provide a little contextual discussion around lead prevention, specifically to early child care and education programs. Which--I include preschools that are organized through public school systems, child care, family childcare, Early Head Start, and Head Start, within my definition of ECE programs, just so that we're clear.

So, in general, kind of linked to what Dr. Lowry finished up talking about the supportive environment at home, quality, early child care and education programs have demonstrated in research over and over again that they have benefits, both to the typically developing children, and children with disabilities in terms of overall learning and healthy development, and that ECE programs can create significant improvements within the cognitive domain related to IQ, or standardized testing and school readiness, whether or not they're promoted to the next grade level, decreased placement in special education classes due to learning problems, and even behavioral benefits compared to children who stay at home.

And so, as we reviewed earlier in the webinar, many of these poor outcomes related to lead exposure are already targeted with your educational programming. And I think that's very important for us to emphasize that quality educational services, that your program already supplies, really supports the healthy development and cognitive growth of children in your community already. And it plays a very integral role in terms of mitigating some of the effects of lead exposure.

So, in addition, there are many services that all early childcare and education programs provide that support prevention of lead exposure. And a good start I recommend, if you're looking at what your program can do is evaluating whether or not you're doing these services well and consistently. And so, hand washing is a very important part of that. So, appropriate hand washing before meal times, or after gross motor play, such as going on the playground, can reduce the ingestion of lead containing dust from your program environment.

You know, Dr. Lowry spoke about the role of key nutrients, like calcium and iron and vitamin C. So providing healthy menus and regular meal and snack time during program hours with special attention to those healthy sources of those nutrients can prevent the absorption of lead. And so, I just want to be clear, in case, you all have further questions about that. Iron sources would be from your lean meats, whole grains and beans, vitamin C from whole fruits or vegetables, and dairy products would be a great source of calcium, along with dark green leafy vegetables too.

So, evaluating your menus and determining how well or how often you're providing these sources consistently for children could be a wonderful intervention for children exposed to lead, not to mention just healthy eating. And the positive eating environment, my next bullet point, really plays a role in here as well, because it is integral to the development and learning of young children, and also, specifically, how that environment during mealtime can encourage children to try new and healthy foods and establishes routines around meal time, such as hand washing, that transition period.

So, that can actually provide a very helpful support in terms of not only just serving children healthy foods that can mitigate lead exposure, but also encouraging them to eat these foods and not just let them sit on the plate. So, I'm sure staff have the skill to provide a positive reinforcement and feedback, and also support learning during meal time and language and development. And then, your cleaning practices--so your regular cleaning practices which I'm sure that you all have, such as sanitizing the toys, furniture, other equipment, can reduce a child's exposure to lead in the dust of the paint during play.

You can also monitor these toys for chipped or peeling paint while doing this. And I talk about a little bit in the next slide, toys on recall, but if you remember several years ago, we had numerous toys who were recalled because they were manufactured in foreign countries that were using lead-based paint or lead contaminated material. So, you know, ensuring that none of your toys within the program are on that recall list can be very important as well. And, I'm sorry, I'm going to go back to the previous slide, because I don't see that I put it on here, but if your program has the capacity to provide nutrition education, excuse me, or a nutrition assessment, an environmental risk assessment such as those questions that Dr. Lowry had earlier, would be a great area to include in your nutrition assessment.

Now, if you're operating in a Head Start or Early Head Start program, then a majority of your enrolled children would qualify as high risk, so you should be encouraging all families within your programs to obtain lead testing for their children. But if you don't provide a nutrition assessment, it might be an important place to put within your intake packet or enrollment packet. Again, I think Dr. Lowry made an excellent point about ensuring that all children are tested for lead. But this is certainly a great way to start the conversation with families. To use these questions as educational tools and linking them with community providers.

Oh, sorry. I went back instead of forward. There we go. And then, in addition-- so if you're a Head Start or Early Head Start program, you should have a health services advisory committee. And this committee is a perfect opportunity to talk about community risk, such as lead testing in the water supply. I'm actually located in Chicago, and I was listening to the radio this morning. And there's a lot of discussion at the city level regarding where the water is tested for the city of Chicago in terms of, is it tested where it enters the pipes or tested when it exits the pipes, and how that can affect the lead testing. And so, that can be informed very much by Health Services Advisory Committee, which is made up of health professionals from around your community.

But they can also help you identify neighborhoods that might have older homes with lead based paint, or other environmental exposures such as a nearby factory. So, the HSAC, as we call it, is a perfect opportunity to discuss access to screening, testing, and removal of services in your community. So, I see, as I glance through some of these chat questions, that a lot of people are talking about: but how do we ensure that these children are being tested? I know that there are some limitations. There are barriers to access to testing. I know that my child's own doctor did not provide the lead based screening and send it to the public health department. And so, it seems to be that there are opportunities within your community, it's just there always seems to be a different structure within each community.

So the Health Service Advisory Committee can help bridge some of those gaps for you. Now, if you don't have an HSAC, your local health department is a great resource as well. They can identify the similar risk with some of their environmental community assessment data. They typically provide testing of lead exposure at their facility and other screenings to families as well, and often will be the entity that's responsible for removal of lead sources or coming to homes and testing water or paint supplies. And then I have next here some development assessments.

So, the American Academy of Pediatrics recommends surveillance of developmental milestones at every well child visit, and screening at nine, 18, and then either 24 or 30 months. And so--well some of the programs, you may have the capacity to conduct your own developmental screening or assessment of milestones or educational domains. Others may not. And so, this is a great opportunity to partner with your child's medical home, ensure families are keeping appointments, receiving these blood screenings and testings, and also tracking whether or not these children are meeting their milestones. And if they're not, looking, as part of an overall assessment of why not and the environmental factors in the world that lead can play. It also may be helpful to check your playground equipment, especially if you're using older equipment.

Is there peeling paint? Are you using equipment that's not necessarily on your property, but a public play space? And also, using the local health department for this, to come help test some of that, would be really helpful. Some other things--I don't this on here, but if your program has a garden for the children, or you use a community garden, and sure it's not located next to a construction site, and this includes home remodeling, especially older homes.

Or you can consider using a raised garden bed with bagged soil, especially for those younger children. Because, unfortunately, I think we're all very family with that they are going to try to eat the dirt and other things, and so something for you to consider. And I mentioned this other one about checking your toys to make sure that they're not on recall. And that's the website you can go visit and see if any of your toys are listed on there. If you're planning any renovations at your facility, using EPA-approved contractors who can actually help assess your current sources of lead in your facilities and then offer any strategies for eliminating the lead sources during the renovation project.

Oh, and I'm sorry, I did forget some of this. The role that early child care programs can play with families is that they can ensure families at risk of lead exposure that they're screened, they're linked to their medical home, and provided appropriate care for lead poisoning. But in an addition to that, you also have, hopefully, some mechanism for family education. This could be something as simple as sending out handouts. And I have some great resources where you can find hand outs that already exist, such as CDC, [.gov/lead](https://www.cdc.gov/lead), and that's in the slides. We'll get to it in a moment--or [epa.gov/lead](https://www.epa.gov/lead). So, you can use some of those. You can--I'm sorry, even host family nights and invite a local medical provider to come and provide family education, or following up after screenings and so forth to ensure that children have obtained their blood level testing results.

And I just want to touch a little bit about community structures as well. So, there are other supports beyond the early child care program. And I feel that I know in Head Start in particular, we often feel that we are placed with quite a bit of family support--burden isn't the correct word, but responsibility. And I think it's important for us to consider that we're not the only mechanism in a community to support families. And by working together, we can essentially create a much stronger net than by working in our silos. And so, I wanted to call the role that Women, Infant and Children can play. Some WIC clinics--and I saw this within the chat box--some WIC clinics do offer lead screenings, where they, while doing the anemia screening, will also collect blood sampling for the lead testing and send it off to the health department. Others do not.

And so it just depends on your community. Utilizing your medical home, creating those partnerships strong partnerships, that can ensure that children are being tested for lead. Child Find--it might be an appropriate referral for children with high blood lead levels so they can assess any learning disabilities. And of course early interventions, supervisors and services for children with disabilities. And then, I talked quite a bit about the health department, but they should be initiating some case management services, they should offer home inspections, and some communities even have online registries that help parents identify homes that are lead safe or that have lead hazards.

Now, I have heard from a few programs with some of the budget cuts that the health department is having more and more difficulty meeting these needs, but encouraging health departments and families to work together can be a great resource. I was just talking to a lovely health manager out in Kansas, as well; and her name was Diane Fepher. And she was talking about something—they use their health department to conduct nutritional assessments, including lead and anemia screenings for families who don't qualify for WIC, or at least are not utilizing WIC. And so, that helps them kind of mitigate some of those services, ensure that children are serviced, and that the lead screenings are conducted.

So, really, what I hope that everyone takes away from the webinar is an overview or general understanding of the risk and exposure elements of lead and what we can do to mitigate some of these. And then have some sort of strategy for going back to your program, and first asking the question, what are the services we offer now that prevent lead exposure? Some of those low hanging fruit, so to speak, such as your hand washing, your cleaning your toys, adding the risk assessment, or at least, discussion in your enrollment intake packet, and then evaluating whether or not you implement these services well and consistently.

So, do you review your policies? Are there ways to strengthen the policy that can reduce the child's exposure to lead? Do you observe your staff in a random week or a random day and determine how often are they really practicing these policies or services? And then a follow-up, why aren't they? Where are the barriers to doing some of this? Do they need clearer guidance, more training? Or in many times, it's simply just hands on deck. So do they need additional support during transition time? So, coming in from outdoor play, and so hand washing time-- do they just need some time to get the kids from point A to point B, and how can you help mitigate some of that can be a great first steps. And then where can we improve or offer additional services?

And hopefully we gave you a few ideas today. And we all have our contact information at the end of this webinar and so if you feel like you need additional guidance, we would love to provide that for you. And I recognize it's the end of the hour, but I did have Patricia Alejandro from San Antonio, Texas, I believe, is on the webinar as well. And she is involved with her Head Start, and to talk a little bit about what they do in their program to help access health care and screenings for some of our children. So Patricia, if you're still online, would you mind sharing your story for a few minutes.

Patricia Alejandro: Yes, ma'am. We have had some really good results with our rural WIC offices in getting us results of children who had the lab work completed earlier. Of course, we have parent consent to access the information. But years ago, we did not have good results in getting that information until we took the time to actually meet with the WIC staff to discuss why it was needed. So, it was that collaboration and building that relationship with the WIC office that has established us a little bit better in the community. And then, together, we've worked out a system that worked better for WIC staff to provide that information.

So, the first thing we did--we submitted a request on a certain day of the week when they have less clients; and then the second thing we did, we consolidated the forms to create less paperwork for them to handle. Then, once we worked through how to request the information in a more collaborative manner, the system worked out very well for both entities.

Florence: Wonderful. Well, thank you. And I would still want to offer the Q-and-A session. So, Dr. Lowry, I want to ask you first, recognizing that we only asked for an hour of your time. Could we talk you into a few more minutes to answer a couple of questions? Are you still there?

Dr. Lowry: Yes, I'm here. I'm sorry. I had myself on mute, so I didn't interrupt. I was trying to figure out how to get there. Yeah, I can stay on.

Florence: Wonderful. So, I'm going to turn it over to my colleague, April, who can ask you come questions that came in through the chat box. And then, any others that we don't have time to get to today, we can certainly include those when we post the webinar and the slides on our ECLKC. And we'll follow up with all those who are registered for the webinar today. So April, do you want to ask a couple questions?

April: Yes, we've gotten a lot of questions in, so we'll get through as many as we can. I think we'll try and stop at about 13 minutes; so let's see how many we can get through. So, the first question is, are pregnant moms required to get a lead test when pregnant, and how do we know if pregnant moms have a high lead level or at high risk?

Dr. Lowry: So no, they are not required to get a lead level when they're pregnant. Ideally, we--so the American Academy of Pediatrics has worked with the American College of Obstetrics and Gynecology, and they have put out a recommendation, and CDP also has recommendations that all pregnant women receive screening, screening in the form of asking the questions. And then if they screen positive, then they should be tested. That doesn't always happen. Many OBs don't recognize lead as a problem and so they don't. If they do get tested there is no--well, that's not true.

So, most states actually require that all lead testing is a reportable illness. And so, anybody who gets tested should have a level that's reported to the state. That doesn't necessarily mean that anything is going to be done, because from a state level they're looking at adults with occupational exposure. And so that's a lead level that's 60 or higher. And we want to catch pregnant women before 60. So, it's really up to the woman to tell you that she had lead poisoning.

April: Thank you. The second question: To what degree are the effects of lead poisoning reversible?

Dr. Lowry: So, that's kind of like a trick question, or it's a trick answer. So, the effects of lead on the brain are irreversible, meaning that when lead binds into the brain, and does whatever lead does--because we don't exactly know--that in itself is irreversible. That said, the effects can be overcome in other positive ways.

And so, you know, at a biochemical kind of standpoint, it's irreversible, but from a "what can we do to overcome them," it's not irreversible. So, again, many of these children live in poverty; they live in a one-parent household; they live in a place where they don't have enriched activity; they're not in Head Start; they don't have play; they don't have anybody reading to them. And those are already things that put this child in harm's way from developing the best person that they can be. And lead is just one aspect of that. And so, if we can actually compensate by doing all of these other awesome things that we should be doing for all children, then the effects are not irreversible. So again, trick question. Sorry to be nebulous, but it breaks my heart when you hear the story about the little boy in Flint who believes he's going to be stupid because his community has been poisoned by lead. And that is not, not true. Everybody from the media went out and said, you know, these kids are going to be harmed and it's irreversible, and all this sort of thing.

No, that child could be very, very, very, very smart, because there are so many things in their environment that affect IQ. And if lead is bringing it down by one or two, think about all those other things that are bringing it down too. And if we can actually improve upon those other things, then the effect is minimal.

April: Right, got it, thank you. So, the next question we've gotten many times in many different forms. So, lead testing is a requirement of EPSDT but some are having trouble getting physicians to perform the blood test because they believe it's unnecessary for Early Head Start and Head Start children. Do you have any suggestions on ways to communicate with physicians and pediatricians to ensure that the blood screening test is being done.

Dr. Lowry: Yes. So, if you have a pediatrician that says, "I'm not going to do it, then you can just point them to the AAP policy on lead because they clearly tell people to do it. If you have more problems I hate to say this but, physicians like talking to physicians. And you have advocates as pediatricians within the American Academy of Pediatrics, namely me And [inaudible] I work with, but also through what's called a pediatric environmental health specialty unit.

Florence knows how to get this information to you, so I'm going to rely on her to get it to you. But it's at pehsu.net: P-E-H-S-U dot net. And every federal region has a pediatrician and maybe a medical toxicologist in your back pocket that you can call and say, I need help. I need these kids' blood tested and my physician's not doing it. And we are your advocates and we will help you get it done.

Florence: Thank you. That's a great point. So, this is Florence, again. I just want to reiterate to all attendees that we will certainly send that out, as some of the resources after this webinar and make sure it's posted with the webinar too, so you have access to some of that.

April: Great, thank you both. Let's see, just a couple more questions. Maybe we'll get to some quick ones. So does lead occur naturally in the soil?

Dr. Lowry: Yes.

So, if you go back to my first slide it is-- well, it's naturally in the earth's crust. So I guess that's not the soil. So, actually, no. It's probably not naturally there; we just know that it is there from all of the contamination that we have had from contaminants, I guess. So no, you wouldn't normally find it there.

April: It's us; we've done it. Got it.

Dr. Lowry: Sorry, I kind of changed my answer midstream. And I'm like, [inaudible], oh, no, not naturally. It's a natural product we don't naturally have in soil.

April: Correct. Got it. So, when a child has a high lead level, how do you suggest that the tests are done to monitor that the lead levels are going down?

Dr. Lowry: The best gold standard way is a venous level. So, the problem with the capillary blood draws that they do on the figure stick is that most of the time these kids already live in a lead environment. And you only need a very, very small amount of lead to actually make the capillary or the finger stick one as a false positive. Because if that capillary one is elevated I'm going to automatically tell you to get a venous. Now, again, many health departments don't do the venous stick. Some physician's offices don't do the venous stick. So, if you have to do one I would do the finger stick, knowing that if it's elevated you have to go get it confirmed. If it's negative, then you don't have to get that confirmed, because it's negative.

April: Got it; thank you. And I think we'll go with one more question. And for everyone who doesn't get their question answered, we will be following up with all of the questions that have been asked via e-mail. So, you'll get your question in writing no matter if we've answered it aloud or not. And that way, we can have a back-and-forth in case you have follow-up questions after we've answered.

So, the last question: Can you get lead poisoning from vegetables grown in a demolition site, or from soil that has lead in it?

Dr. Lowry: Yes. So, basically, lead that's in the soil can be incorporated into the vegetables. You're probably not going to get a significant amount of lead poisoning. You might get lead exposure. And you know, the amount is obviously dependent on how much is in the food. You're not going to get a level of 20 micrograms per deciliter because you ate a couple of carrots. But once it's in the soil, it can actually get to be incorporated into food. And it's very similar to arsenic and rice issue. So it's just whatever's in the soil being incorporated into it.

April: Got it. I think that is the last question we'll take. And thank you so much, Dr. Lowry. I'll turn it back over to Florence now.

Florence: Oh, OK. That's great. I just wanted to thank you as well for your time and expertise on the call. I think it was really helpful. And like we said, we will make sure to answer everyone's questions who submitted them in the chat.

But, if not, we have our email address and toll-free number for the National Center on Early Childhood Health and Wellness that you can reach out to if something occurs to you after this call. Thank you so much for everyone who participated on the call and joined us this afternoon. You guys have a great afternoon.

Dr. Lowry: Thank you.

[inaudible]